



OIL ANALYSIS REPORT

WEAR	NORMAL
CONTAMINATION	ABNORMAL
FLUID CONDITION	NORMAL

Machine Id
LGS00181
 Component
Middle Biogas Engine
 Fluid
CITGO PACEMAKER GAS ENGINE LFG LA 40 (--- GAL)

RECOMMENDATION

No corrective action is recommended at this time. Resample at the next service interval to monitor.

Test	UOM	Method	Limit/Abn	Current	History1	History2
Sample Number		Client Info		WC0803422	WC0803415	WC0803414
Sample Date		Client Info		08 Jul 2024	01 Jul 2024	17 Jun 2024
Machine Age	hrs	Client Info		68191	68024	67695
Oil Age	hrs	Client Info		430	263	453
Filter Age	hrs	Client Info		430	263	453
Oil Changed		Client Info		N/A	N/A	N/A
Filter Changed		Client Info		N/A	N/A	N/A
Sample Status				ABNORMAL	NORMAL	NORMAL

WEAR

All component wear rates are normal.

Iron	ppm	ASTM D5185m	>45	7	5	8
Chromium	ppm	ASTM D5185m	>2	0	<1	<1
Nickel	ppm	ASTM D5185m	>2	0	<1	0
Titanium	ppm	ASTM D5185m		0	<1	<1
Silver	ppm	ASTM D5185m	>5	0	0	0
Aluminum	ppm	ASTM D5185m	>10	2	2	<1
Lead	ppm	ASTM D5185m	>5	0	<1	<1
Copper	ppm	ASTM D5185m	>14	2	2	2
Tin	ppm	ASTM D5185m	>13	2	2	3
Vanadium	ppm	ASTM D5185m		0	<1	0
White Metal	scalar	*Visual	NONE	NONE	NONE	NONE
Yellow Metal	scalar	*Visual	NONE	NONE	NONE	NONE

CONTAMINATION

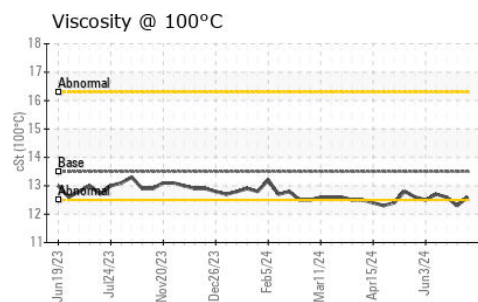
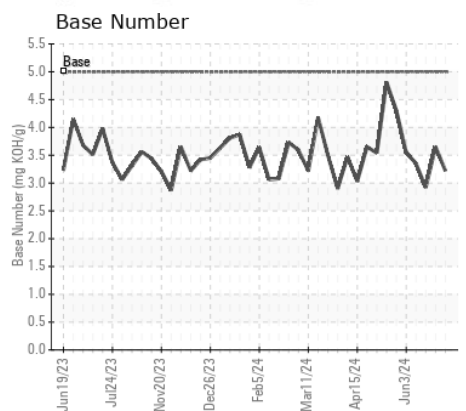
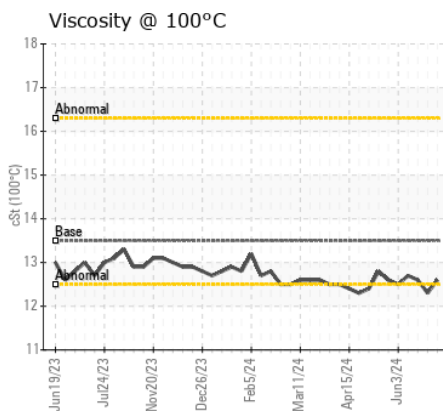
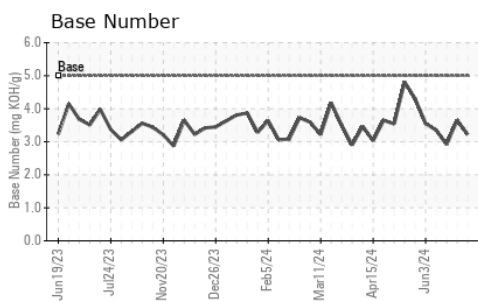
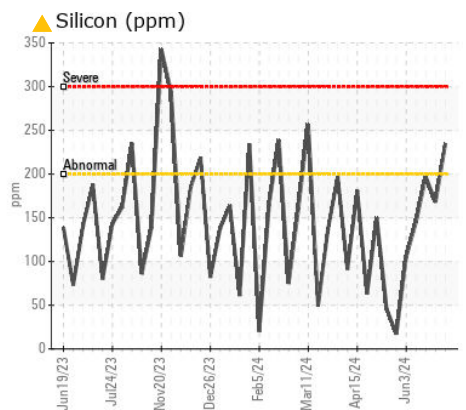
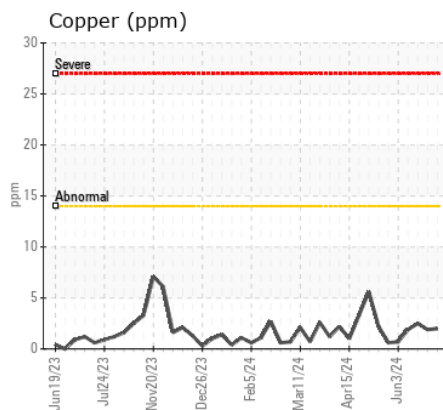
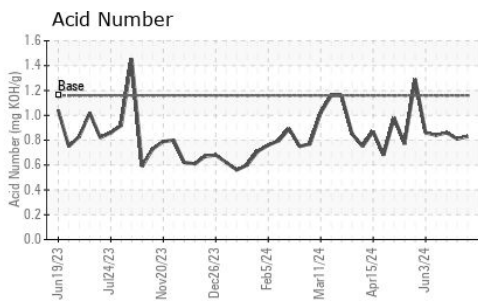
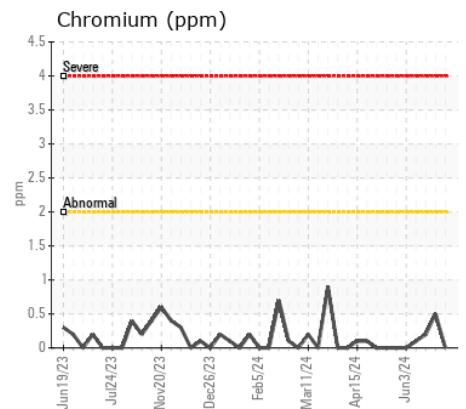
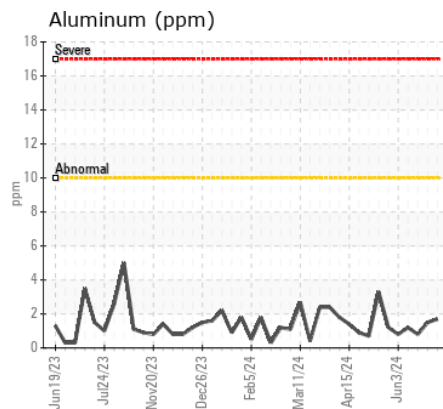
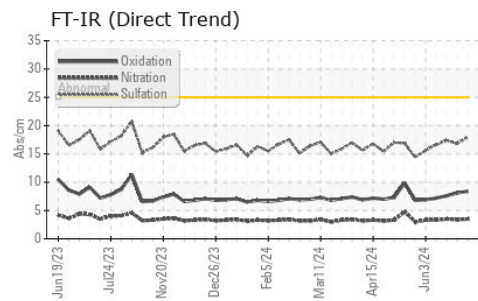
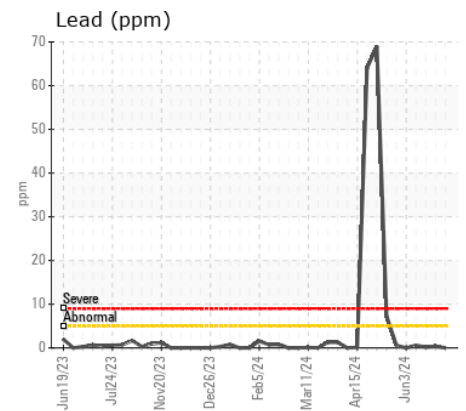
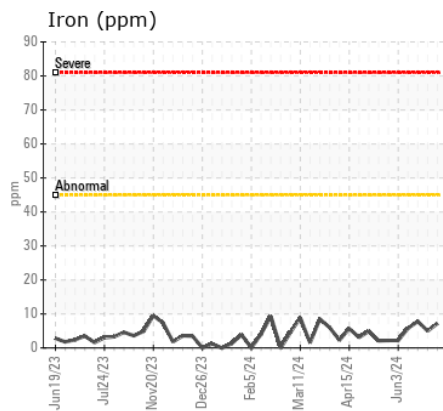
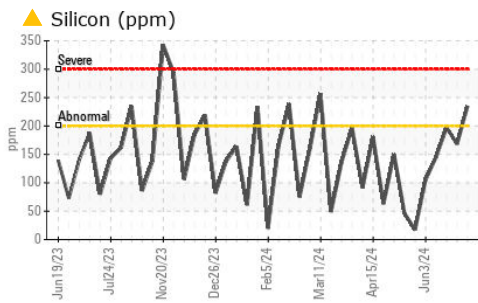
Elemental level of silicon (Si) above normal indicating ingress of seal material.

Silicon	ppm	ASTM D5185m	>200	▲ 235	168	197
Potassium	ppm	ASTM D5185m	>20	2	<1	0
Fuel		WC Method	>4.0	<1.0	<1.0	<1.0
Water		WC Method	>0.1	NEG	NEG	NEG
Glycol		WC Method		NEG	NEG	NEG
Soot %	%	*ASTM D7844		0	0	0
Nitration	Abs/cm	*ASTM D7624	>20	3.5	3.4	3.5
Sulfation	Abs/.1mm	*ASTM D7415	>30	17.9	16.8	17.4
Silt	scalar	*Visual	NONE	NONE	NONE	NONE
Debris	scalar	*Visual	NONE	LIGHT	NONE	NONE
Sand/Dirt	scalar	*Visual	NONE	NONE	NONE	NONE
Appearance	scalar	*Visual	NORML	NORML	NORML	NORML
Odor	scalar	*Visual	NORML	NORML	NORML	NORML
Emulsified Water	scalar	*Visual	>0.1	NEG	NEG	NEG

FLUID CONDITION

The BN result indicates that there is suitable alkalinity remaining in the oil. The AN level is acceptable for this fluid. The condition of the oil is suitable for further service.

Sodium	ppm	ASTM D5185m		2	0	3
Boron	ppm	ASTM D5185m		4	2	2
Barium	ppm	ASTM D5185m		0	0	0
Molybdenum	ppm	ASTM D5185m		6	16	3
Manganese	ppm	ASTM D5185m		0	<1	<1
Magnesium	ppm	ASTM D5185m		38	36	26
Calcium	ppm	ASTM D5185m		1570	1570	1490
Phosphorus	ppm	ASTM D5185m		304	319	294
Zinc	ppm	ASTM D5185m		370	393	364
Sulfur	ppm	ASTM D5185m		3603	3212	3557
Oxidation	Abs/.1mm	*ASTM D7414	>25	8.4	8.1	7.6
Acid Number (AN)	mg KOH/g	ASTM D8045	1.16	0.83	0.81	0.86
Base Number (BN)	mg KOH/g	ASTM D2896	5	3.22	3.65	2.92
Visc @ 100°C	cSt	ASTM D445	13.5	12.6	12.3	12.6



Certificate L2367

Laboratory : WearCheck USA - 501 Madison Ave., Cary, NC 27513

Sample No. : WC0803422

Lab Number : 06232385

Unique Number : 11115878

Test Package : MOB 2

Received : 10 Jul 2024

Tested : 11 Jul 2024

Diagnosed : 11 Jul 2024 - Sean Felton

BLACK OAK

5054 HWY HH

HARTVILLE, MO

US 65667

Contact: CHIP MATHEWS

chip.matthews@cubedistrictenergy.com

T:

F:

To discuss this sample report, contact Customer Service at 1-800-237-1369.

* - Denotes test methods that are outside of the ISO 17025 scope of accreditation.

Statements of conformity to specifications are based on the simple acceptance decision rule (JCGM 106:2012)